DOI:
10.1093/cje/beu043

NOTIONS OF ORDER AND PROCESS IN HAYEK: THE SIGNIFICANCE OF EMERGENCE

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***Cambridge Journal of Economics*, 39: 1167-90**

1. INTRODUCTION[1]

How can an awareness of ontological issues inform the history of economic thought? If judged according to the efforts of the majority of historians of economics, the answer appears to be, 'Not at all.' Traditionally, the study of the ontological conceptions held by economists, whether explicitly or otherwise, has been conspicuous by its absence from the history of economic analysis. What makes the neglect of ontological issues by historians of thought rather surprising is that many prominent heterodox economists – such as Commons, Keynes, Lachmann, Marx, Schumpeter, and Veblen, to name but a few - have couched both their criticisms of orthodox economics, and also the case for their own preferred methods of economic analysis, on ontological grounds. More recently, however, the approach adopted by historians of economic thought appears gradually to be changing, with a series of papers emerging – largely from scholars associated with Cambridge University - that demonstrate the importance of ontological issues for understanding various issues in the history of economic analysis.[2]

The work of Friedrich Hayek provides a case in point. Hayek was a scholar of enormous range, who made major contributions not only to economic theory but also to political philosophy and theoretical psychology. The roots of Hayek's transformation from narrow economist to wide-ranging social theorist and philosopher lie in his increasing dissatisfaction with the capacity of the notion of equilibrium to do justice both to the nature of social order and also to how order is established. In his early writings, Hayek consistently argued that a genuinely *economic* explanation of some phenomenon must be couched in the language of equilibrium analysis (Caldwell 2004: 155-62).[3] By the mid-1930s, however, Hayek was becoming increasingly

[1] The research for this paper was carried out in the Easter Term of 2013, whilst the author was a Visiting Fellow of Peterhouse, Cambridge. I am very grateful to the Master and Fellows of Peterhouse for their support and hospitality. Bruce Caldwell, Steve Fleetwood, and Jochen Runde read an earlier version of the paper and made very helpful suggestions, as did two anonymous referees. Earlier versions of this paper were presented at the History of Ontological Thinking in Economics conference (Nice, June 2013), the Southern Economic Association conference4 (Tampa, Florida, November 2013), and the Cambridge Realist Workshop (Cambridge, February 2014). I am grateful to the participants in those events for their comments. The usual disclaimer applies.

[2] See, for example, Graça Moura (2002, 2003), C. Lawson (1994, 1996, 1999), T. Lawson (1995, 2002), Pratten (1993, 1998), Lewis and Runde (2007), and Lewis (2011).

[3] In his 1928 paper on monetary economics, for instance, Hayek wrote that the static equilibrium construct is a 'methodologically valuable fiction … [whose] field of application is identical with that of economic theory' ([1928] 1984: 72, 75). Similarly, in

sceptical about the merits of equilibrium analysis. Hayek's participation in the socialist calculation debate of the 1930s – and, in particular, the way in which advocates of market socialism used general equilibrium theory to bolster their case for central planning – led him to realise that the assumptions made by equilibrium analysis about people's knowledge preclude a satisfactory answer to what Hayek saw as the central question confronting the discipline of economics, namely how people learn enough about each other's actions to be able to form mutually compatible plans. More specifically, as Hayek argued in a paper that is an early landmark in his journey from neoclassical economist to a wide-ranging social theorist, namely 'Economics and Knowledge', the problem with equilibrium analysis is that it confines itself to situations in which people's plans are already coordinated and therefore assumes away the key problem that market economies must solve, namely that of ensuring that people learn enough about one another's intentions to be able to coordinate their plans and thereby achieve an orderly allocation of resources (Hayek [1937] 1948; also see Caldwell 2004: 209-220, 409-22).

Although Hayek's concerns in this regard ultimately led him to abandon the very methodological tool he had previously regarded as indispensable for economic theory, namely equilibrium analysis, he did not completely forsake studying the problem of plan coordination. On the contrary, he remained concerned with it throughout his post-1937 career. What did change, however, was the approach that Hayek employed in addressing the problem, with his pre-1937 commitment to equilibrium analysis ultimately giving way to a broader, social-theoretic approach which placed considerable emphasis on the causal and explanatory significance for understanding how plan coordination arises of the social-structural context in which people act, and whose central organising concept was not that of general equilibrium but rather that of socio-economic order (Fleetwood 1995; Vaughn 1999).

Underpinning Hayek's shift from economics-as-equilibrium-analysis to economics-as-social-theory was an increasing preoccupation on his part with issues of socio-economic ontology, that is, with issues concerning the nature of (the constituents of) the socio-economic world. Hayek's dissatisfaction with equilibrium analysis, although initially expressed in epistemic terms, ultimately led him to elaborate in considerable detail on various issues of socio-economic ontology, including – most notably for the purposes of this essay – the notions of 'order' and 'process'. Some of this story is well known. In particular, Fleetwood (1995) and Lawson (2005: 437-42) have argued that Hayek's transformation was underwritten by his growing appreciation of the importance of the fact that the social world is open (in sense of displaying few if any event regularities) and stratified (in the sense that it contains social structures, in particular social rules, that are ontologically distinct from, and irreducible to, people's actions). However, while extremely important and enlightening, these accounts arguably devote too little attention to another feature of Hayek's account, namely its emphasis on the importance of emergent properties. The main claim of the current paper, building on Gaus (2006), is that a satisfactory account of the notions of 'order' and 'process' to which Hayek subscribes, and in particular a clear understanding of how those two concepts relate to each other in his scheme of thought, requires an appreciation – not always apparent in the secondary literature, though clearly possessed by Hayek himself – of the ontological category of 'emergence'. And it is by illuminating how Hayek uses the notions of emergence and emergent properties to reconcile his

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Monetary Theory and the Trade Cycle, Hayek contends that any economic explanation of the cycle must build on the foundations provided by the theory of equilibrium ([1933] 1966: 28-30).

account of social order with his view of society as evolving via a process of cultural or group selection that the contribution of this paper, and in particular its ontological orientation, ultimately lies.[4]

The structure of the paper is as follows. Section 2 briefly describes Hayek's account of how plan coordination is achieved in decentralised market economies. The next two sections explore, make explicit, and systematise the notions of order and process that underpin Hayek's analysis. More specifically, Section 3 emphasises the importance for understanding Hayek's account of social order of the notions of emergence and emergent properties, as a (largely implicit) part of Hayek's account of the economy as a complex system. Ultimately, for Hayek, the capacity of liberal market economies to coordinate people's actions in the face of tacit and dispersed knowledge is an emergent property that arises only when people's interactions are governed by certain sets of rules. Section 4 builds on this static or synchronic analysis of the coordinative powers of the market as an emergent property of a given system of rules by considering the question of how the set of rules in question comes into being. Here the focus shifts away from Hayek's account of order, and from a static or synchronic view of emergence, towards his views about process, in particular his account of society as developing through an evolutionary process of group selection, and correspondingly to a more dynamic or diachronic perspective on emergence. Section 6 concludes the paper with a brief discussion of one of the key implications of the accounts of order and process offered in the paper for debates about the coordinative powers of free market economies.

2. HAYEK'S ACCOUNT OF THE POSSIBILITY OF SOCIAL ORDER IN DECENTRALISED MARKET ECONOMIES: A BRIEF SUMMARY

In his 1937 paper on 'Economics and Knowledge', Hayek argues that the key question for understanding the generation of social order concerns how people acquire the knowledge required to form mutually compatible plans when that knowledge is dispersed throughout the economy as a whole rather than being concentrated in the mind of one individual (Hayek [1937] 1948: 33, 46). Hayek first made significant headway in his efforts to answer this question in his seminal paper on 'The Use of Knowledge in Society', where he highlighted the coordinating role of freely adjusting market prices. When individuals act on the basis of their own knowledge, Hayek argued, they generate changes in relative prices which indicate the consequences of their actions for the scarcity of various goods and thereby convey to others hints about the (at times tacit and always dispersed or local) knowledge that informs those actions, thereby enabling people successfully to coordinate their plans. On this view, prices act as 'knowledge-surrogates', summarising in a publicly available form the subjective judgments about the value of resources which individuals form on the basis of their personal knowledge, thereby enabling other people to

[4] It is telling in this respect that neither Fleetwood nor Lawson devotes significant attention to Hayek's theory of cultural evolution or group selection. It is unsurprising, therefore, that their accounts also devote little attention to the role of emergence in Hayek's writings, because – as has already been stated, and as will be explained in detail below – it is by providing a conceptual bridge between Hayek's work on the spontaneous market order and his theory of society as developing through a process of group selection that the significance of his use of emergence is to be found. If this claim is correct, then it suggests too that those commentators who question the compatibility of Hayek's work on spontaneous order with his evolutionary theory of group selection may be mistaken (see, e.g., Vanberg 1986: 97, Paul 1988: 261, and Hodgson 1993: 177).

adjust their behaviour to (constantly changing) circumstances about which they have little or no direct awareness (Hayek [1945] 1948: 83-90).

However, as Hayek hints in his 1945 paper (see [1945] 1948: 88), and as he argues more systematically and explicitly in his post-1960 writings, the information provided by market prices enables people to form reasonably accurate expectations of one another's plans only if it arises against 'a fairly constant framework of known facts', that is against the relatively stable background provided by various social rules and norms (Hayek 1976: 125; also see [1964] 1967: 91-92) (Fleetwood 1995; Vaughn 1999; Lewis 2015a). As Hayek came to realize, the dissemination of knowledge required for plan coordination is facilitated not only by price signals but also by a set of shared social rules, including both formal and informal rules such as the laws of property, tort and contract, and norms of honesty and promise-keeping, respectively. It is the fact that people act in accordance with the same general guidelines about how to interpret and act in various kinds of situation that makes it possible for them to form reasonably accurate expectations of each other's future conduct, thereby enabling them to formulate plans that have a reasonable chance of coming to fruition:

> What makes men members of the same civilization and enables them to live and work together in peace is that in the pursuit of their individual ends the particular monetary impulses which impel their efforts towards concrete results are guided and restrained by the same abstract rules. If emotion or impulse tells them what they want, the conventional rules tell them how they will be able and be allowed to achieve it. (Hayek 1976: 12)

Perhaps most notably, by facilitating enforceable contracts, the set of rules in question enables people to formulate and embark upon plans of action in the confident expectation that the contributions from their fellow men required to implement those plans will actually be forthcoming. It is for this reason that Hayek contends that abstract legal rules 'could almost be described as a kind of instrument of production, helping people to predict the behaviour of those with whom they must collaborate' (Hayek [1944] 2007: 113).

The outcome generated when the competitive interaction that takes place free markets is guided by such rules is orderly in the following sense:

> By 'order' we shall … describe *a state of affairs in which a multiplicity of elements of various kinds are so related to each other that we may learn from our acquaintance with some spatial or temporal part of the whole to form correct expectations concerning the rest, or at least expectations which have a good chance of proving correct*. (Hayek [1976] 1982: 36)

And the orderliness of free market activity manifests itself in the fact that people can usually predict their behaviour of their fellows well enough to devise plans that have a decent chance of being brought to fruition.

While thus far we have emphasised the way in which at any given point in time purposeful human agency is facilitated by an inherited stock of social rules, it also important also to note that the continued existence of those rules depends upon current human action (Hayek

[1942-44] 1979: 152; [1967] 1967: 72-80). In drawing upon the set of inherited rules in order to act, people reproduce - or, if individuals break away from traditional rules and engage in new forms of conduct which others subsequently imitate, transform - those rules, thereby ensuring their continued existence into the future (perhaps in a modified form). Hayek can thus be seen to subscribe to a *transformational conception of socio-economic order*, according to which the rules that facilitate the formation of mutually compatible expectations, and which therefore underpin the possibility of socio-economic order, are both the condition for, and also the reproduced outcome of, people's actions (Hayek 1960: 62, 1979: 145-46, 157-61). On this view, social order *just is* the (never-ending) process whereby people draw on (pre-existing, historically given) social structures (such as the legal system) in order to act and, in doing so, subsequently either reproduce or transform the rules in question (Fleetwood 1995: 135-55).[5]

3. THE ROLE OF EMERGENCE AND EMERGENT PROPERTIES IN HAYEK'S ACCOUNT OF ORDER

We move on now to conceptualise the nature of Hayek's account of socio-economic order. Significantly for our present purposes, the capacity of the price mechanism to coordinate the decision-making of a multitude of individuals, each of whom is pursuing his or her self-interest in the light of his or her own local knowledge, can be thought of as an emergent property of the free market system. To see why, it is necessary first of all to explain why is meant by the notion of emergence and emergent properties.

3.1. Emergence and emergent properties

The term *emergence* refers to situations where, when certain elements or parts stand in particular relations to one another, the whole that is formed has properties that are not possessed by its constituent elements taken in isolation. The properties that arise when the elements are arranged in the requisite way are known as *emergent properties*, while any whole that possesses an emergent property is known as an *emergent* or 'higher-level' entity. Emergent properties are structural or relational in the sense that their existence depends not only on the presence of their ('lower-level') constituent parts but also on those parts being organised or arranged into a particular structure that involves them standing in specific relations to one another. The classic example of emergence is provided by the case of water, many of whose properties – being liquid at room temperature, for instance, or being able to extinguish fires and quench a person's thirst – are quite different from the properties of the individual atoms of which water is composed. It is only when a collection of hydrogen and oxygen atoms is organised into the specific form of water molecules that the aforementioned properties obtain. Water, then, is an emergent entity, whilst

[5] One implication of the transformation model of social activity is that the category of process, understood as denoting the centrality of the genesis, reproduction, and/or transformation of some structure over time, must be central to social theory. On this view, social structures are inherently dynamic and processual (Lawson 1997: 34-35, 170-71). This view is, of course, also central to Hayek, who in commenting on the evolution of social and biological institutions approvingly quotes the systems theorist Ludwig von Bertalanffy on the intrinsically dynamic, processual nature of all structures: 'What are called structures are slow processes of long duration, functions are quick processes of short duration. If we say that a function such as the contraction of a muscle is performed by a structure, it means that a quick and short process wave is superimposed on a long-lasting and slowly running wave' (Bertalanffy 1952: 134, quoted in Hayek 1967: 101 n. 14).

many - though not all - of its properties (e.g. liquidity) are emergent properties (Elder-Vass 2007a: 28; Lawson 2012a: 348-49).

The notion of emergence suggests that reality consists of a hierarchical structure of ontologically distinct 'levels', each of which has its own distinctive properties. These levels include the physical, the chemical, the biological, the mental, the individual, and the social. The existence of entities in the higher strata always depends upon their constituent (lower-level) parts, but at the higher levels there are emergent properties that are qualitatively novel in the sense of being irreducible to the properties of those lower-level entities taken in isolation (Lawson 1997: 63-64, 175-77).

Significantly for what follows, the emergent properties possessed by the entities at any given level of reality can include causal powers. A causal power is a capacity to behave in a particular way, to bring about a particular type of effect, and thereby to make a difference to the course of events that takes place in the world. Examples of causal powers include water's capacity to extinguish fires and the capacity of societies where production is organised under the division of labour to produce higher levels of output than ones not so characterised. An emergent entity possesses causal powers because the elements of which it is composed are arranged so as to constitute a mechanism that produces the power in question. A 'mechanism' can be defined as a way of acting or working of a structured entity. Mechanisms possess the causal power to produce certain types of outcomes in virtue of the way in which their component parts are arranged and relate to one another (that is, in virtue of their structure). For example, in virtue of the way their respective parts are configured and so interact with each other, copper has the causal power to conduct electricity and a bicycle has the causal power to convey people to their destination at a certain speed (Lawson 1997: 21-23; Lewis 2000).

The fact that the existence of emergent entities depends not only on the presence of particular elements but also on their standing in certain relations to one another implies that such entities cannot be entirely eliminated from causal explanations that involve the exercise of their causal powers. It may be possible to achieve an *explanatory reduction* of the emergent properties, in the sense that one can explain how the properties or causal powers of an emergent entity like water result from the properties of its parts and the interaction that takes place between them when they are arranged the specified way (i.e. one can identify and illuminate the working of the causal mechanism responsible for the existence of the emergent property). However, this is not the same thing as an *ontological* or *causal reduction* in which the emergent entity itself is shown to consist of nothing more than its lower level elements so that, in particular, its causal powers are reducible to the causal powers of those elements taken in isolation.

To see why, suppose that we have an explanatory reduction that enables us to give an account of the existence of an emergent property in terms of (i) the constituent parts of an emergent entity H, plus (ii) the relations that obtain between those parts when they are organised into the form of an H. In that case, while we can to give an account of how the property arises as a result of the causal interaction between the parts when they are an H, we have done no more than explain that emergent property in terms of a *system* – the parts *and* their relations – that exists *only* when the emergent entity H exists, so we can eliminate neither that entity nor its emergent properties from our causal explanations. Neither ontological nor causal reducibility follow. The reason is that the existence of the emergent property depends not only upon the presence of the relevant parts but also upon their being organised or arranged in such a way that

the particular set of relations characteristic of the entity like H obtains between them. If the parts in question were not organised to form an H – if the relevant system were not formed - then the causal influence that depends upon the parts being arranged in that particular way would not manifest itself. It follows, therefore, that the causal power is a *sui generis* property of the relational organisation of the parts when they form an H, not of the individual parts taken either in isolation or as an unstructured aggregate. As Lawson has put it, '[T]he emergent phenomenon is a system … [which] includes organising relations that are external to the lower-level elements … [so that] the totality is necessarily ontologically irreducible to the lower-level components alone' (2012a: 352). Lawson continues, moreover, that:

> The argument against causal reducibility is no less straightforward. For it is clear enough that any emergent higher-order forms of efficient causation are precisely powers of the emergent system, and depend as much on the organising structures and relations as on the lower-level components that the latter organise. (2012a: 352)

On this view, an emergent entity like H consists not only of its constituent parts but also of the structure of relations that obtains between them. It is the importance of the relational organisation of the parts for the existence of the emergent causal power that precludes ontological and causal reduction and to which the description of those parts as forming a system is meant to draw attention.

The ontological and causal reducibility of the emergent entity H implies that it, and more specifically its emergent system-level causal powers, cannot be excised or eliminated from causal explanations that depend on the exercise of that entity's causal powers. Any causal explanation that depends upon both the properties of the parts and also upon the way in which they are typically related when they form an H is in effect an explanation in terms of that emergent entity's system-level casual powers. For example, while we can explain the liquidity of water in terms of its atomic constituents and the relations (chemical bonds) obtaining between them when they assume the form of water molecules, the property of liquidity obtains only when the emergent entity, water, is present. The causal power to extinguish fires and to slake one's thirst is a property of water, not of the individual atoms of which it is composed. It follows, therefore, that causal explanations of how fires can be extinguished or thirst quenched have to make reference, if only implicitly, to that emergent entity, because it only when hydrogen and oxygen atoms are arranged into the form of water that the relevant causal power is present (Elder-Vass 2007a: 30-3; 2007b: 415; Lawson 2012a: 350-53).

The account of emergence outlined thus far suggests that an analysis of the emergent properties - including the causal powers - of an emergent entity must contain three main parts:

> E1: it must specify the parts or elements of which that entity is usually composed;
>
> E2: it must provide an account of how those elements are structured or related to one another in order to form the entity in question; and
>
> E3: it must provide a causal explanation of how, when the parts are arranged in the requisite way, their behaviour gives rise to the emergent causal powers of the entity in

> question (i.e. it must illuminate the working of the generative mechanism through which the interaction of the parts, structured in the relevant way, produces the emergent power).

An analysis that satisfies these three requirements can be said to provide a *synchronic* account of how at a given point in time the existence of a particular set of parts, organised so that they stand in certain relations to one another, gives rise to the existence of a particular emergent property and so constitutes an emergent whole (Elder-Vass 2007a: 31, 30).

Moreover, given that the presence both of the parts and also of the relations that structure them into the form of an emergent whole cannot be taken for granted – their presence is a contingent matter, dependent upon the operation of causal factors in the real world – a complete causal analysis of an emergent entity also requires that the synchronic analysis of its emergence be supplemented by a *diachronic* account of how the requisite configuration of parts and relations comes about. More specifically, the latter demands the following:

> E4: an account of the causal process through which an emergent entity is brought into existence in the first place and sustained over time (Elder-Vass 2007a: 29-31; Lawson 2012a: 353-54).

Having now explained the philosophical notion of emergence, we shall move on to consider its significance for developing our understanding of the notions of order and process in Hayek's writings.[6]

3.2 The significance of emergence for understanding Hayek's account of the nature of social order

In the light of the above, it can be shown that on Hayek's account the coordinative powers of the free market system are an emergent property of the free market system. The reason is that the emergent causal power in question, which Hayek ([1967] 1967: 68, 70) refers to as 'the overall order of actions', is possessed only by a particular whole - namely the free market system that is constituted by a group of people whose interactions are structured by a set of rules that includes the formal rules of contract, tort and property law, along with informal norms of trust and promise-keeping - and not by those individuals taken in isolation:

> The overall order of actions in a group is … more than the totality of regularities observable in the actions of the individuals and cannot be reduced to them ... It is more than the mere sum of its parts but presupposes also that those elements are related to each other in a particular manner. (Hayek [1967] 1967: 70)

[6] One referee expressed concerns that this paper might be read as an exercise in Whig history, whereby Hayek's use of the notion of emergence is judged according to its consistency with modern perspectives on that concept. Lest anyone be in any doubt, let me explicitly disavow such an interpretation here. The account of emergence in Section 3.1 was provided simply to ensure that readers unfamiliar with the notions of 'emergence' and 'emergent properties' would acquire an understanding of them, the better to appreciate the significant role played by those ideas in Hayek's writing on order and process in the social world. They are most certainly not being used to assess whether Hayek's use of those notions would pass muster if assessed by reference to the standards of contemporary philosophical accounts of emergence. For more on the sources from which Hayek derived his notion of emergence, see Lewis (2014a).

Hayek underlines the ontological irreducibility of the emergent causal power to coordinate people's actions by noting that 'it is at least conceivable that the same overall order of actions may be produced by different sets of rules of individual conduct'. It is possible to make sense of this possibility, Hayek contends, only by acknowledging that 'the system of rules of individual conduct and the order of actions that results from the individuals acting in accordance with them are not the same thing', that is by acknowledging the existence of an ontological distinction between rules and individual actions, on the one hand, and the emergent causal power, on the other (Hayek [1967] 1967: 67, 68).

We can elaborate on this issue by mapping Hayek's account of the coordinative powers of the market system onto the three requirements (E1-E3) for a synchronic account of an emergent causal power listed in Section 3.1 above. The first requirement is that we specify the parts or elements of which the emergent entity – in this case, the market system - is composed. This is straightforward in Hayek's case; the parts or elements of the market system are simply the people who populate it.

Second, a synchronic causal analysis of an emergent entity also requires an account of how its elements must be structured or related to one another in order to form it. Hayek satisfies this requirement in his account of how the possibility of order in decentralised market economies demands that the competitive interaction that takes place between people must be structured and governed by the set of social rules characteristic of the market system. For it is the abstract rules of contract, property and tort law, coupled with informal social norms of honesty and promise-keeping, that specify how people must relate to one another in order to form a properly functioning market system. More specifically, those rules define various positions (e.g. buyers and sellers, employers and employees, creditors and debtors, etc.) and set out both the rights that people occupying those positions enjoy and also the obligations they bear. In doing so, they specify in broad terms how the occupants must relate to one another (e.g. legally binding employment contracts specify the rights and responsibilities of employers and employees, detailing for example both what an employer must pay his/her employee and also what the employer can expect from the employee in return). In this way, the rules in question define the relations between those positions and, therefore, between the people who occupy them, specifying in broad terms how people should relate to one another in order to form a working market system. And it is people's knowledge of the legal system, and of the rights and obligations that take upon themselves when they enter into legally binding contracts, and of moral norms and rules, that plays a crucial role in facilitating the formation of mutually compatible plans (Hayek 1973: 106-09, 172 n. 25; also see Lewis 2008: 184-90). It is in his analysis of the institutional prerequisites of a functioning market economy – and, in particular, in his account of the properties that the relevant legal rules must possess if they are to structure people's interactions in a way that facilitates plan coordination – that Hayek satisfies the second requirement for a synchronic emergent causal analysis of the emergent coordinative powers of the free market.

Third, and finally, a synchronic causal analysis of an emergent causal power requires an account of the working of the generative mechanism through which the interaction of the parts of the emergent entity, suitably structured, produces the power in question (Hayek 1952b: 151-52). This is precisely what Hayek provides in his analysis of how social order is possible in decentralised market economies. For what Hayek offers is an account of how, when the competitive interaction that takes place on free markets is governed and structured by a suitable

set of social rules, a configuration of relative prices is generated that – taken together with the background information provided by the rules - enables people to adjust their plans to one another well enough for them to have a reasonable chance of coming to fruition (i.e. for an orderly social outcome to obtain). In this way, Hayek gives an account of the causal processes through which people acquire knowledge of one another's (current and future) actions.

Hayek's account of social order can thus be seen to satisfy all three requirements for a synchronic causal analysis of an emergent property, in this case the emergent causal power of the institutions of a free market economy to coordinate people's activities in the face of decentralised decision-making and dispersed, and often tacit, knowledge. The power in question is *emergent* because it is possessed only by a particular whole – namely the free market system that is constituted by a group of people whose interactions are structured by the relevant set of social rules – and not by those individuals taken in isolation. And that emergent whole – the people *plus* the relations engendered by the set of rules - cannot be eliminated from causal explanations of the coordinative properties of free markets because, if people were not so related, then their interactions would not be structured in the way required to produce an orderly outcome (Hayek 1973: 39). In Hayek's words:

> It is the so-called wholes, the groups of elements which are structurally connected, which we have learned to single out from the totality of observed phenomena ... [and which] are the condition for the achievement of many of the things at which we as individuals aim, the environment which makes it possible even to conceive of our individual desires and which gives us the power to achieve them (Hayek 1952b: 67, 145-46)

On this view, therefore, it is necessary to consider in their own right the nature and properties of the sets of rules that structure the interactions between people and that, in the case of the free market - but not a centrally planned economy - ensure that the relations obtaining between people are such that they can form reasonably accurate expectations of one another's actions. These institutions constitute 'a constant structural element [in society] which can be separated and studied in isolation' (1952b: 59; also see [1964] 1967: 27 and 1973: 106). For Hayek, therefore, reductionism is not feasible and the rule-governed, relationally-defined social wholes that structure people's interactions are causally efficacious, explanatorily irreducible factors in their own right and as such a key concern for social theorists ([1964] 1967: 39).[7]

3.3 Emergence and complexity in Hayek

In displaying emergent properties – or 'higher level regularities', as Hayek also terms them (Hayek, quoted in Caldwell 2013: 15) - the market economy exhibits one of the hallmarks of what Hayek terms 'complex systems' (Hayek [1955] 1967, [1964] 1967). While Hayek's account of complexity is not completely clear (Fiori 2009, Rosser 2010; Lewis 2015b), complex systems such as the market economy appear in his view to have two defining characteristics. The first is that the 'the number of significantly interdependent variables is very large and only some of them

[7] For other instances of Hayek's anti-reductionism, see Hayek 1952a: 46-47 and [1964] 1967: 39.

can in practice be individually observed' ([1955] 1967: 8). The second is – as Hayek puts it in the one passage in his writings where he explicitly invokes the philosophical notion of 'emergence' – the way in which 'a certain combination of ... structures produces an overall structure possessing distinct characteristic properties':

> The "emergence" of "new" patterns as a result of the increase in the number of elements between which simple relations exist, means that this larger structure will possess certain general or abstract features which will recur independently of the particular values of the individual data, so long as the general structure (as described, e.g., by an algebraic equation) is preserved. Such "wholes", defined in terms of certain general properties of their structure, will constitute distinctive objects of explanation for a theory, even though such a theory may be merely a particular way of fitting together statements about the relations between individual elements ... What we single out as wholes ... will be determined by the consideration [of] whether we can thus isolate recurrent patterns of coherent structures of a distinct kind which we do in fact encounter in the world in which we live (Hayek [1964] 1967: 26)

More specifically, emergent properties arise in systems that are characterised by what Hayek terms *organised complexity*:

> Organised complexity here means that the character of the structures showing it depends not only on the properties of the individual elements of which they are composed, and the relative frequency with which they occur but also on the manner in which the individual elements are connected with each other. (Hayek [1975] 1978: 26-27; also see [1964] 1967: 29-30)

Like other such ordered structures, social orders display 'regularities which cannot be wholly reduced to the regularities of the parts' action' ([1967] 1967: 74). And, as we have seen, prominent amongst such 'higher level generalities' or 'higher level regularities', as Hayek variously terms such emergent properties, is the power to coordinate people's actions ([1964] 1967: 29; also see [1967] 1967: 77-78 and Hayek, quoted in Caldwell 2013: 15).[8]

Significantly, and in keeping with the account of emergence outlined in Section 3.1 above, Hayek argues that models of social order that simply explain how, when people's (inter)actions are governed by a particular set of rules, there arises a system-level capacity to generate an orderly allocation of resources, are incomplete. For while such static or synchronic analyses of how a given set of rules constitutes a mechanism that, when set in motion by human action, generates a particular emergent causal power are of course valuable, they lack a

[8] Additional evidence in support of the claim that Hayek subscribes to a layered ontology can be found in his view that complex systems are hierarchical, with one level of emergent entities constituting the building blocks for the next. More specifically, teaching notes that Hayek produced for a seminar class on 'Scientific Method and the Study of Society', held at the University of Chicago in late 1952, included a chart listing phenomena at different 'levels of organisation', ranging from the gene to the cell to individuals to society, along with the corresponding fields of study (genetics, physiology, etc.) (Caldwell 2004: 298-99). The distinction between these different levels of organisation and, in particular, the fact that each is allocated its own field of study – rather than it being claimed that an eliminative reduction of the higher-level entities to the lower-level ones is possible – lends further support to the view that Hayek adopted an emergentist perspective (cf. Lawson 1997: 63). For more on all this, see Lewis (2014a).

diachronic account of how that set of rules comes into being. As Hayek puts it in an important 1967 essay entitled, 'Notes on the Evolution of Systems of Rules of Conduct' ([1967] 1967), while it is the case that 'for the explanation of the functioning of the social order at any one time the rules of individual conduct must be assumed to be given ... these rules of conduct have themselves developed as part of a larger whole' ([1967] 1967: 72-73):

> The existence of those relations which are essential for the existence of the whole cannot be accounted for wholly by the interaction of the parts but only by their interaction with an outside world both of the individual parts and the whole. If there exist recurrent and persistent structures of a certain type (i.e. showing a certain order), this is due to the elements responding to external influences which they are likely to encounter in a manner which brings about the preservation or restoration of this order; and on this, in turn, may be dependent the chances of the individuals to preserve themselves. From any given set of rules of conduct of the elements will arise a steady structure ... only in an environment in which there prevails a certain probability of encountering the sort of circumstances to which the rules of conduct are adapted. ([1967] 1967: 76; also see p. 71.)

What is required for a complete analysis of the existence of emergent properties such as the overall order of actions, and of the structures or emergent entities that bear them, therefore, is 'a theory of their evolution' that takes into account 'circumstances which are not properties of the structures themselves but particular facts of the environment in which they have developed and exist' ([1967] 1967: 76). And, as the passages just quoted suggest, it is in evolutionary biology that Hayek believes can be found the building blocks for a diachronic model of the process through which the set of rules that underwrites the overall order of actions comes into being. This brings us to Hayek's account of the nature of economics processes, to a more detailed analysis of which we now turn.

4. HAYEK'S ACCOUNT OF PROCESS: THE ROLE OF EVOLUTION AND GROUP SELECTION IN THE DISCHRONIC EXPLANATION OF THE OVERALL ORDER OF ACTIONS

Hayek writes in a number of places of the importance of 'the twin ideas of evolution and spontaneous order' for understanding how order is possible in decentralised market economics ([1967] 1967: 77; also see Hayek 1979: 158 and [1966] 1991: 81).[9] So far as the notion of spontaneous order is concerned, Hayek's point is that - as we have seen - order arises in decentralised market economies because, when people's (inter)actions are structured by certain sets of rules, a generative mechanism is established that gives rise to the emergent causal power to coordinate people's plans even in the absence of an over-arching, guiding intelligence. The notion of evolution, on the other hand, is important because Hayek believes that the sets of rules in question are themselves the product of a process of competition between groups that adhere to different rule systems. This is Hayek's controversial notion of group selection, according to

[9] For an historical overview of the development of evolutionary themes in Hayek's thought, see Caldwell (2000).

which human societies develop through a process of competition, not between individual people, but between *groups* of people, where the groups in question are defined by reference to the sets of rules to which their members subscribe. As Hayek puts it, '[W]hat may be called the natural *selection* of rules will operate on the basis of the greater or lesser efficiency of the resulting *order of the group*' ([1967] 1967: 67):

> It is the resulting overall order of actions but not the regularity of the actions of the separate individuals as such which is important for the preservation of the group … [S]ystems of rules of conduct will develop as wholes … [and] the selection process of evolution will operate on the order as a whole ([1967] 1967: 68, 71).

What the passage just quoted also makes clear is that, for Hayek, the trait that forms the basis for the selection of groups in this process of societal evolution is in fact an emergent property, namely (what he terms) the overall order of actions.[10] In Hayek's scheme of thought, therefore, the notions of emergence, spontaneous order and evolution are intimately bound together, because it is in virtue of their capacity (or lack thereof) to generate the emergent causal power to coordinate people's actions without centralised direction that groups – and, more specifically, the sets of rules that characterise them - are selected in the process of social evolution and so prosper and grow (or, respectively, decline and – ultimately - wither away).

Herein, then, lies the crux of Hayek's diachronic explanation of how the emergent capacity of market economies to coordinate people's actions came into being. What Hayek is trying to do is to explain the existence of a particular emergent property or higher-level regularity, namely the overall order of actions. And, in his view, the requisite explanation takes the form of an evolutionary account of how in the past it was those groups whose activities were structured by sets of rules that gave rise to the emergent property in question that were able to generate the wealth required to sustain higher populations, while those groups that did not adhere to such rules declined in size and ultimately were eliminated, leading eventually to an outcome in which groups that exhibit the emergent power in question came to predominate. Hence, for Hayek, 'the present order of society has largely arisen, not by design, but by the prevailing of the more effective institutions in a process of competition … a process of winnowing or sifting, directed by the differential advantages gained by groups from practices adopted for some unknown and perhaps purely accidental reasons' (Hayek 1979: 154-55; also see Hayek 1984: 322 and 1988: 6 and Gaus 2006: 236, 238).[11] In this way, Hayek provides an account of the causal process through which an emergent entity is brought into existence in the first place and sustained over time, as requirement E4 for the analysis of emergent properties demands (see Section 3.1 above).

It will be helpful in unpacking Hayek's ideas about group selection to elaborate briefly on what, in abstract terms, evolutionary processes, both natural and social, involve. The requisite

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[10] Hayek expresses similar views in the first volume of *Law, Legislation and Liberty*, where he writes that, 'It should be remembered that … selection will operate as between societies of different types, that is, guided by *the properties of their respective orders*, but that the properties supporting this order will be properties of the individuals, namely their propensity to obey certain rules of conduct on which the order of action of the group as a whole rests' (Hayek 1973: 44). This distinction between the properties of the order itself, and the properties of the individual elements that form part of the order, indicates, of course, that Hayek is relying here, as elsewhere, on the notion of emergence, and that it is on the basis of their emergent properties that groups are selected (or not, as the case may be).

[11] As Hayek puts it elsewhere, the market order is 'the result of spontaneously grown institutions which had developed because they made societies prosper which stumbled upon them' ([1966] 1991: 91; also see Hayek 1960: 30-31, 34, 59-60 and Hayek [1975] 1978: 27).

account can be found in the so-called Population-Variety-Reproduction-Selection or PVRS model of natural selection, outlined by Lawson (2003: 119-31). As the model's name suggests, its essential elements are fourfold.

It is necessary first of all to specify the population of entities that interact with their environment and compete with one another. In the case of the social realm, Lawson argues, it is social practices – rather than individual people – that are the individuals in question, whilst the environment in which selection takes place is constituted by the sum total of other related, often competing, social practices. In the social world, therefore, the process of interaction with the environment through which entities are selected just is social (human) interaction. Moreover, and this is the second key feature of an evolutionary explanation, the members of the relevant population must exhibit variety in the sense that – in addition to possessing the features that are the hallmark of the relevant population – they have some attributes that differentiate them from each other. In society, such variety takes the form of differences in the practices followed by different (groups of) people.

Third, explanations couched in evolutionary terms must specify a *mechanism of replication*, whereby entities that are selected are able faithfully to pass on to their offspring the attributes in virtue of which they were successful in the process of environmental competition. An account of how highly accurate – though not perfect - 'copying' of the replicators that endow successful interactors with their fitness or competitive edge is essential for the success of evolutionary explanations, because such models seek to account for outcomes in terms of the cumulative impact on the overall distribution of population characteristics of differences in the survival and reproduction rates of different kinds of interactor. But if replication is unreliable, so that the attributes that confer fitness upon one generation of interactors cannot faithfully be passed on the next generation, then the scope for using evolutionary explanations is curtailed.

The fourth feature of an evolutionary explanation is an account the selection mechanism whereby members of the population interact with their environment and, in virtue of their (varied) attributes, are more (or less) successful than others in that interaction, thereby being selected (or not) by that environment. In outlining the mechanism, it is important to specify both the *interactors* – that is, the entities that compete in the environment in which selection takes place – and also the *replicators*, which are the entities that pass on their structure if and when they are replicated or reproduced. In the social realm, Lawson argues, the most plausible candidates for the role of interactor or unit of selection are social practices, in which case the process of competition through which different interactors are selected centres on the extent to which different social practices become more or less common. On this view, the replicators are the social rules that underpin – in the sense of facilitating and constraining – those practices.

Overall, then, evolutionary models must specify three key mechanisms: a variety-generating mechanism that produces different kinds of replicators; a replication mechanism through which replicators are transmitted from one interactor to another; and a selection mechanism through which interactors with particular traits are selected in the specific environment in which they operate. In Hayek's words: 'Biological evolution and cultural evolution both rely on the … principle of selection: survival or reproductive advantage. Variation, adaptation and competition are essentially the same kind of process, however different their particular mechanisms, particularly those pertaining to propagation. Not only does all evolution rest on competition; continuing competition is necessary even to preserve existing achievements'

(1988: 26; also see [1964] 1967: 32). And the goal of such models is to explain how, through the selection and therefore differential survival and reproduction rates of the various interactors (in Hayek's case, groups), certain replicators are selected (in the Hayekian example, sets of rules that give rise to the emergent order of actions) (Hayek 1979: 155).

How does Hayek's theory of cultural evolution via group selection appear when viewed through the lens provided by the PVRS model? Consider first the population of interactors that compete with one another in the environment in which selection takes place. At first glance, there appears to be a divergence here between the PVRS model and Hayek. For while the PVRS model suggests that interactors are (individual) social practices, Hayek's theory is one that (as we have seen) focuses on competition between *groups* of people based on their respective capacities to coordinate the actions of dispersed individuals, harness dispersed and tacit knowledge, and thereby generate the wealth required to sustain increases in their membership. As Hayek put it, '[C]ultural evolution operates largely through group selection' (1979: 25). More precisely, in Jerry Gaus's felicitous phrase, Hayek's account is one in which the units of selection are the 'systems of cooperation – arising out of systems of rules' – that characterise different groups (Gaus 2006: 241).

Consistent with Hayek's emphasis on the notion of group selection, the role of the replicators in Hayek's account is provided by the sets of rules (not individual rules taken in isolation). That is the say, the emergent property upon which group selection acts is the outcome of the interaction of several different rules rather than being simply the aggregation of their separate effects. The different sets of rules structure the actions of the members of the various groups and, in virtue of their collective capacity to underpin the emergent causal power to coordinate people's actions, determine the success of those groups in the process of competition through which selection occurs. Hence Hayek's remark that, '[S]ystems of rules of conduct will develop as wholes':

> The evolutionary selection of different rules of individual conduct operates through the viability of the order it will produce, and *any given rules of individual conduct may prove beneficial as part of one set of such rules*, or in one set of external circumstances, *and harmful as part of another set of rules* or in another set of external circumstances … [Hence] the effects of such a change in any one rule can be assessed only out of an understanding of all the factors determining the overall order. ([1967] 1967: 71, 68; also see p. 73 and Hayek 1979: 167, 171.)

For example, as Hayek notes, the existence of the emergent causal power to coordinate people's actions requires both formal legal rules and also informal moral rules; one of those types of rules alone will not suffice to generate the overall order of actions that, on Hayek's account, underpins the growth in the prosperity and size of successful groups (Hayek 1960: 36, 158, 1984: 321-22. 1988: 6, 12).[12]

Whether the differences between Hayek's position and the PVRS model are as stark as Hayek's emphasis on groups, and sets of rules, seems at first glance to suggest is something we

[12] '[F]reedom has never worked without deeply ingrained moral beliefs and … coercion can be reduced to a minimum only where individuals can be expected as a rule to conform voluntarily to certain principles' (Hayek 1960: 62). Also see Buchanan (1985: 25-26) and Lewis (2014b, 2015b).

shall consider in more detail below. Before doing so, however, it is necessary to consider the resemblance between Hayek's model and other aspects of the PVRS approach, namely the variety-generating and selection mechanisms.

Variations in the sets of rules that characterise different groups can, by affecting the ability of those groups to sustain the emergent capacity to coordinate action, yield advantages to some of those groups in the process of social competition. Such advantages in turn lead – via a process described in more detail below – to the selection of those groups (and their associated set of rules). Before considering the processes through which selection occurs, however, it is important to consider Hayek's views on the origins of the variations in rules that arise between different groups. Hayek raises two possibilities here: accident; and purposeful rule-breaking. New rules may arise for 'purely accidental reasons' (Hayek 1979: 155), the accidents in question concerning the way in which knowledge, skills, attitudes and habits are combined (Hayek 1960: 29-33).[13] In that case the variation that is introduced into the evolutionary process really is random. Second, however, and more significantly for Hayek, new rules can arise because there are times when, in the light of their personal circumstances and views, an individual make a conscious decision to 'brave general opinion and to disregard a particular rule which he regards as wrong' (1979: 171; also see p. 161). In the case of moral rules in particular, Hayek argues that, '[I]t is, in fact, desirable that the rules should be observed only in most instances and that the individual should be able to transgress them when it seems to him worthwhile to incur the odium this will cause … It is this flexibility of voluntary rules which in the field of morals makes gradual evolution and spontaneous growth possible, which allows further modification and improvement' (1960: 63). Indeed, according to Hayek's 'conjectural history', the rise of the extended order was driven at least in part by the willingness of 'courageous' individuals to break traditional rules prohibiting trading with strangers, the lending of money at interest, the recognition of individual property rights, etc., so as to initiate new practices 'which then did prove beneficial to the group in which they prevailed' (Hayek 1979: 171, 161).

Fourth, and finally, in order to provide convincing explanations of particular patterns of outcomes, evolutionary models must specify a reliable mechanism of replication. That is to say, in the case of Hayekian cultural evolution, it is necessary to explain how the set of rules that underpins the superior performance of successful groups is accurately transmitted from one generation of group members to the next, so that those groups continues to enjoy a comparative advantage in the struggle for survival. In considering this issue, the first thing to note is that, according to Hayek, cultural evolution – in contrast to natural evolution – involves the inheritance of acquired characteristics. 'The mechanism of cultural evolution is not Darwinian,' Hayek (1988: 23) argues, because it rests on the inheritance of acquired characteristics:

> [A]ll cultural development rests on such inheritance – characteristics in the form of rules guiding the mutual relations amongst individuals which are not innate but learnt ... [C]ultural evolution simulates Lamarckism. (1988: 25; also see [1967] 1967: 66, 78 and 1979: 156-57, 165)

[13] For more on how new combinations of, say, capital goods can give rise to novel (emergent) products and production techniques, see Lewis (2011b: 180-81) and Harper and Endres (2012: 357-63).

The learning in question occurs principally though imitation (Hayek 1988: 21). But if it is through imitative learning that acquired characteristics can be transmitted from one generation of group members to another, the question remains: what grounds, if any, does Hayek have for believing that such imitation is sufficiently accurate?

In fact, as Gaus (2006: 251) has argued, Hayek does have reasons for holding such belief, and they are to be found in his account of the nature and working of the human mind found in his book, *The Sensory Order* (1952a). While considerations of space do not permit a detailed exposition of the theoretical psychology set out in that book – for a fuller account, see Lewis (2012: 370-73) - the key points for our present purposes are as follows. For Hayek, the mind consists of a hierarchy of interconnected nerve fibres. These fibres act as a rule-governed system of classification that discriminates between different physical stimuli in such a way as to give rise to the pattern of sensations – the sensory order, as Hayek terms it – that we actually experience (Hayek 1952a: 2-8, 13-19, 37-40, 47). More specifically, according to Hayek, these neural structures create in people dispositions both to perceive certain classes of external stimuli as constituting particular types of situation, and also ultimately to respond to those circumstances in certain ways. On this view, the structure of neurons found in people's brains is the material embodiment of a set of rules governing perception, along with all of the other activities of our minds and much of human action. As Hayek puts it, 'we ought to regard what we call mind as a system of abstract rules' (Hayek [1969] 1978: 43; also see Hayek [1962] 1967: 43-46; [1969] 1978: 38-42, 48-49; and Lewis 2012: 375-76).[14]

Significantly for our present purposes, Hayek argues that neural structures governing how people perceive and respond to the world are malleable in the sense that they are shaped by the context in which people find themselves. People in any one group will inhabit similar environments and will therefore have similar experiences. They will therefore develop similar - though not, of course, identical - neural structures and mental 'maps' of the external world. Consequently, they will tend to perceive particular external events as falling into the same category of situation and particular types of action as constituting the same kind of rule-governed behaviour (Hayek 1952a: 110). Thus, rather than simply trying to copy other people's behaviour from scratch, so to speak, younger members of a group grow up in a context in which they develop dispositions to perceive and respond to situations – that is, they develop dispositions to behave in accordance with rules – that are similar to those of their elders. In this way, faithful replication of rules becomes much more likely.

[14] What this account also reveals is that Hayek's theory of the mind is relational, in the sense that it is the (rule-governed) structure of the connections between neurons that governs people's cognitive processes and which accounts for the operation of the mind (Hayek 1952a: 12). On this view, the unique causal powers of human mind – including not only its ability to generate the phenomenal world of sense experience but also its capacity to imbue events with meaning and to initiate courses of actions in a purposeful fashion – are all possessed only by a particular whole – namely the hierarchically ordered arrangement of neurons found in the human brain – and not by those neurons taken either in isolation or as an unstructured aggregate. They are all, in other words, emergent properties of the structured arrangement of neurons found in the human brain and central nervous system (Lewis 2012: 370-73). It is also worth noting in this context that, for Hayek, the mind develops via an evolutionary process of selection through which neural structures are reinforced, or whither, according to how successful they are in promoting behaviour that is well adapted to the prevailing context and which therefore enables a person to succeed in his or her goals. More specifically, Hayek's account is one in which configurations or structured groups of neurons are selected - or not, as the case may be - in virtue of their emergent capacity to classify the world in a way that enables the individually to adapt to, and successfully to navigate, his or her environment (Hayek 1952: 74). This process of neuronal group selection on the basis of the emergent properties of the group as a whole is, of course, analogous to the process of group selection that Hayek believes accounts for the development of rule-governed social systems such as the market economy. For more on this, see Lewis (2014c: Section 4.3).

In attempting to specify the mechanism through which group selection occurs, Hayek focuses on population growth, both in absolute and relative terms. On his account, the reason why those groups whose members follow sets of rules giving rise to overall order of actions prosper and displace other groups lies in their superior ability to generate the wealth required to sustain larger populations. '[T]he extended order resulted not from human design or intention,' Hayek (1988: 6; also see pp. 120-22) contends, 'but spontaneously … by means of an evolutionary selection – [involving] the comparative increase of population and wealth – of those groups that happened to follow [the requisite rules].' However, rather than settling on one account of how greater wealth leads to a larger population, thereby leading over time to the selection of certain groups, Hayek invokes several different possible mechanisms, the significance of which varies according to the particular time and circumstances being considered. The increases in wealth facilitated by a more advanced division of labour may lead to more rapid population growth either through higher birth rates ('more rapid procreation') or through immigration ('the attraction of outsiders') as members of less successful groups seek to join more successful ones (Hayek 1979: 159). More successful groups may also grow by conquest, with those groups whose populations failed to adhere to rules conducive to the creation of the extended order being 'exterminated by those who did' (Hayek 1979: 160). Finally, and less antagonistically, selection may occur through the members of less successful groups observing the success of their rivals and choosing to adopt similar practices ('selection by imitation') (Hayek 1960: 59). In all of these ways, Hayek contends, the advantages conferred upon groups who subscribed to the rules of conduct characteristic of the extended order 'enabl[ed] them to expand more rapidly than others and ultimately to supersede (or absorb) those not possessing similar customs groups subscribing to other sets of rules (Hayek 1988: 43; also see 1973: 18).

We are now in a position to return to the question posed earlier about whether the differences between Hayek's account of cultural evolution and the PVRS model are as stark as they first appear. There is in fact reason to believe that they are not because, as we shall see, the PVRS model can encompass the group-level selection by which Hayek sets such store, as well as allowing conceptual space for the direct selection of individual rules (something that, as we shall see, Hayek also acknowledges, as he develops what – for all his emphasis on the level of the group – is in fact a multi-level model of cultural evolution).

The key point to note is that the PVRS model allows for two ways in which competing social practices can be selected (Martins 2010). The first involves what is termed the *indirect selection* of social practices, whereby the individuals, organisations, groups, etc., that engage in particular social practices are selected – or weeded out, as the case may be - in the process of social competition, thereby impinging on the incidence on certain practices. Selection is indirect in the sense that, rather than the individuals, organisations, groups, etc., in question consciously choosing whether or not to continue with certain practices, it is the groups themselves that are selected, with the overall incidence of certain practices changing only as the size of the groups that adopt them changes. As Lawson puts it, emergent wholes such as groups prosper and 'are "selected" … according to features found to be beneficial, *at the level of the totality*' (Lawson 2012b: 15; emphasis added). This is, of course, quite consistent with Hayek's account of group selection, one implication of which is that – as groups compete on the basis of their ability to generate wealth and thereby sustain or increase their membership – their size, and therefore the incidence of the sets of practices they pursue, will also change: sets of practices that are not

conducive to the generation of an overall order of actions will become less common as the groups that adopt them are selected against and, therefore, shrink; while combinations of practices that support an overall order of actions will become more common as the groups that follow them prosper and grow in size. Hence Hayek's remarks that cultural change proceeds via the 'selective evolution of rules and practices', involving in particular the 'selective elimination of less suitable conduct' (1979: 154, 1960: 26; also see 1979: 155, 157, 159).

What this suggests is that, once the indirect selection of practice is taken into account Hayek's account of cultural evolution is in fact quite compatible with the PVRS model. Indeed, the parallels between the PVRS model and Hayek's evolutionary approach extend further, in the sense that both portray order as arising from the elimination of systems that are *not* conducive to order. As Lawson writes:

> [T]he great mystery covered by the topic of emergence is how order can come about at all when the forces of nature seem to push towards only disorder ... [T]he second law of thermodynamics holds that everything tends basically to messiness (or to increased entropy). However order clearly does emerge and so must do so via, not by somehow overcoming, the second law. The way to make sense of this ... is to view any emergent structure or order as one that contingently or fortuitously remains after other potential structures have been absented by the forces in question ... [More specifically,] a form of order emerges just because or where a structure or arrangement can withstand (or can best withstand) processes to disorder or destruction. The emergent relational structure is the result of processes of absenting (of alternative potential structures). (Lawson 2012b: 7, 9)

In an almost identical vein, Hayek writes as follows:

> [N]ot every regularity in the behaviour of the elements does secure an overall order. Some rules governing individual behaviour clearly make altogether impossible the formation of an overall order … The classical instance of rules of the behaviour of the elements which will not produce order comes from the physical sciences: it the second law of thermodynamics or the law of entropy, according to which the tendency of the molecules of a gas to move at constant speeds in straight lines produces a state for which the term 'perfect disorder' has been coined. Similarly, it is evident that in society some perfectly regular behaviour of the individuals could produce only disorder: if the rule were that any individual should try to kill any other he encountered ... the result would clearly be the complete impossibility of an order … Society can thus exist only if by a process of selection rules have evolved which lead individuals to behave in a manner which makes social life possible. (Hayek 1973: 44; also see Hayek [1967] 1967: 67)[15]

[15] It seem likely that, in writing this passage, Hayek drew on the work of Ludwig von Bertalanffy, who developed the notion of open systems in order to understand how (biological) order might develop in a world to which the second law of thermodynamics applies. The second law states that the amount of entropy or disorder in the universe is increasing. This implies that physical interactions should proceed towards the least-ordered state possible - that is, the state of maximum entropy - so that order is the least probable state of affairs and chaos the most likely. However, in apparent contradiction to that law, biological life has clearly displayed a tendency to evolve into increasingly complex and more highly organised forms. Bertalanffy explained the apparent incongruity by pointing out

For Hayek, then, as for Lawson, it is through the elimination of groups whose characteristic set of rules does not generate a social order of actions, and which cannot therefore withstand pressures to disorder or elimination, that those groups that *do* follow rules that generate the emergent property in question come to dominate. And a major task of social theory, as Hayek sees it – and one doubts that Lawson would demur - is precisely to analyse the properties of the (sets of) rules that are conducive to the generation of this emergent property: '[T]he question which is of central importance as much for social theory as for social policy is thus what properties the rules [that govern those institutions and structure how people interact] must possess so that the separate actions of the individuals will produce an overall order' (1973: 45; also see Hayek 1952a: 65-67, 97-98, 124-25 and [1967] 1967: 70-72).

In addition to the process of indirect selection just considered, there is also, second, the *direct* selection of rules and practices, whereby social practices are chosen (or abandoned) through the conscious decisions of individual people. It is worth noting in this respect that, for all his emphasis on indirect, group-level selection operating on (the emergent properties generated by) sets of rules and practices, Hayek also admits the possibility of such direct selection. Not for nothing does Hayek comment that 'cultural evolution operates *largely* [i.e. not exclusively] through group selection' (1988: 23). The most obvious case of the direct selection of individual rules and practices is to be found, of course, in Hayek's accounts of innovation and imitation in rule-following, both of which involve individual people making a conscious decision to adopt a new rule or practice in the light of their subjective assessment of the personal gains to be had from so doing. In contrast to group-level processes, therefore, where rules are selected on the basis of their capacity to contribute to a wider set of rules that generates an overall order of actions, lower-level selection involves rules being chosen on the basis of their appeal to individual people.

The overall picture that emerges from Hayek's writings on cultural selection, then, is one of a multi-level evolutionary process in which rules are subject are subject to pressure from at least two directions. The first source of selective pressure comes from 'above', as it were, as the 'systems of cooperation' to which those rules contribute fare more or less well in the higher-level process of group competition. Hence Hayek's remark that, 'These rules of conduct have evolved because the groups who practiced them were more successful and displaced others (1973: 18). But there is also pressure from 'below', as individual rules are selected in virtue of their appeal to, and ability to command the allegiance of, individual people, as described by Hayek when he

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that the second law of thermodynamics applies only to systems that are closed in the sense of being isolated from their environment. Biological phenomena, on the other hand, constitute what Bertalanffy referred to as open systems, understood as systems which interact with their environment and which can maintain themselves in a continual, non-equilibrium steady state by importing matter and energy from that environment and exporting their entropy or waste to it. In a book cited by Hayek both in *The Sensory Order* and also in his essay on 'The Theory of Complex Phenomena' (Hayek 1952: 83, 195, [1964] 1967: 25 n. 8), Bertalanffy writes as follows: 'According to the classical law of entropy, the natural trend of events is directed towards a chaotic state, characterised by maximum disorder, or, in other terms, towards thermodynamic equilibrium, where all processes come to a stop … In contrast, the thermodynamics of open systems inaugurates completely new points of view. Systems of this kind need not approach maximum entropy and disorder and a standstill of processes in thermodynamic equilibrium. Instead, spontaneous order, and even an increase in order, can appear in such systems (Bertalanffy 1952: 145; also see Bertalanffy 1950: 155-57 and Bertalanffy 1952: 112-113, 123-28). For a longer discussion of Bertalanffy's influence on Hayek, see Lewis (2014a).

comments that, 'morals, law and such like, are ... the products of selective evolution transmitted by imitative learning' (1988: 24; also see Whitman 1998: 57-60 and Rosser 2011: 126).[16]

5. CONCLUSION

This Section concludes the paper, not by summarising what has gone before, but rather by drawing out one important implication of the account of the notions of order and process in Hayek's work.

Hayek views the ability of the market to coordinate people's plans as an emergent property of the set of rules that characterises the liberal market economy. Put slightly differently, those rules constitute a generative mechanism that, when set in motion by the behaviour of the people whose (inter)actions they shape and structure, gives rise to the emergent causal power to coordinate people's plans in the absence of centralised direction. This last point, that the mechanism underpinning the social order of actions is animated only by human agency, is significant because it implies that outcomes in the market are the product of the interplay or interaction between (at least) two ontologically distinct and relatively autonomous causal powers, namely the social order of actions and the power of people in engage in purposeful, creative decision-making. It is for this reason, of course, that Hayek describes the working of the market system as involving the interplay of causal powers – or 'regularities', as Hayek terms them – 'on ... two levels' and involving more specifically the 'interaction between the regularity of the conduct of the elements [people] and the regularity of the ... structure' ([1967] 1967: 73, 76-77; also see Hayek 1979: 158).

But if it is indeed this case that the actual outcome produced by the market system is the result of the interplay between two ontologically distinct, and relatively autonomous, levels, 'the individual and the social', each of which possesses its own distinct (emergent) causal powers, then there arises the possibility that the capacity of the market to bring people's plans into conformity with one another might be offset by the capacity of human agents to respond so autonomously, so creatively - and, therefore, so unexpectedly - to their circumstances that they surprise one another and as a result develop plans that are less, not more, compatible. To express this point in the language used by later generations of Austrians, the creative powers of human agents may be such that discoordinating forces arise, not merely as a result of exogenous shocks but endogenously, as part of the market process. The possibility also arises, therefore, that the tendency to discoordination produced by creative human agency may even outweigh the capacity

[16] Matters are actually even more complicated than this, for there are passages in Hayek's work where he also appears to countenance the indirect selection of practices through the selection of *individuals* so that it is individual people – rather than groups – that are the interactors or units of selection. Consider, for example, the following excerpt from *The Constitution of Liberty*: '[T]he competition on which the process of selection rests must be understood in the widest sense. It involves competition between organised and unorganised groups no less than *competition between individuals*' (Hayek 1960: 37). Hayek elaborates on this possibility in *Notes on the Evolution of Systems of Rules of Conduct*, writing as follows: 'Although the existence and preservation of the order of actions of a group can be accounted for only from the rules of conduct which the individuals obey ... the properties of the individuals which are significant for the existence and preservation of the groups, and through this also for the existence and preservation of the individuals themselves, have been shaped by *the selection of those ... individuals ... which at each stage of the evolution of the group tended to act according to such rules as made the group more efficient*' ([1967] 1967: 72, emphasis added; also see pp. 71, 76-77). While not featuring prominently in Hayek's work – as noted earlier, he thinks that cultural evolution is 'largely' a group-level process – such passages do indicate that there remains room within the Hayekian account for the indirect selection of practices through the selection of different kinds of individual, with those rules and practices being selected which are conducive to the fitness of individual people (Gaus 2007: 240-45).

of the liberal market economy to bring plans more closely into conformity with each other so that the operation of the market process leads to less, not more, plan coordination (Lachmann 1976: 129; Rizzo 1996: xvii-xxi).[17]

Ultimately, therefore, as Hayek himself clearly recognized, even in the absence of external disturbances the question of whether the market system tends to produce greater plan coordination cannot be resolved unequivocally on the basis of *a priori* argument alone. As Hayek remarked in 1983, 'while the analysis of individual planning is in a way an *a priori* system of logic, the empirical element enters in people learning about what other people do … [Y]ou can't claim, as Mises does, that the whole theory of the market is an *a priori* system, because of the empirical factor which comes in that one person learns about what another person does' (Hayek, quoted in Caldwell 2004: 221; also see Hayek [1937] 1948: 45–48 and Caldwell 2013: 20, 29-30). Of course, the evidence indicates *ex posteriori* that the coordinative powers tend more often than not to prevail. Paris is fed. But as Hayek clearly recognised there can be no guarantees that such will always and invariably be the case.

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[17] On this view, the emergent causal power of the market to coordinate people's actions is best viewed as giving rise to a non-empirical or transfactual tendency towards the dovetailing of people's plans, whose impact on the outcomes that actually arise may be offset by the impact of other, countervailing tendencies. For more on all this in the context of Austrian economics, see Lewis (2011a).

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